The following document is a sample Class 3 QAPP. A Class 3 QAPP must be written if the study is internal but the duration is longer than a year and covers more than 2 analytes OR if an external Lab is used. Please see Page17-18 of the SCDHEC Guidance Document for Preparing QAPPs for Environmental Monitoring Projects/Studies (Rev 1, Oct 2007) for more information.

A. Project Management

A1. Title Page

Edisto River Basin Study

Prepared by Ben Buchanan
January 2008

Comment: This is an example only, not all information concerns Mr. Buchanan's actual study.

Project Manager: Tabatha Corley, Manager
Water Quality Section

Lead Organization: Department of Health and Environmental Control
Region 5-Aiken Environmental Quality Control
206 Beaufort Street NE,
Aiken, SC 29801
(803) 641-7670

Project Location: Edisto River Basin

Project Manager: _____ Date:_____
Tabatha Corley

Region 5 Director: _____Date:_____
Rick Caldwell, II

BOW: _____ Date:_____
Carol Copeland, Watershed Manager

_____Date:_____
David Graves, Aquatic Biology Section Manager

ARESD Director _____Date:_____
Sandra Flemming

OA Office: _____Date:_____
Nydia Burdick, Manager

Comment: This is an updateable Table of Contents. To update click on the table and hit F9. You may choose to update the pages or the entire table. In order to add items to this table, you must view the outline toolbar. Then highlight the item you wish to add and select Level 1, 2, or 3. Then you must update the table as above and choose update the entire table in order to see the new item.

A2. Table of Contents

A3 Distribution List

Comment: In this table there should be anyone involved with the QAPP- regional directors, project manager, field manager, QA Office, watershed manager, Ambient Water Staff-Dave Graves, Bill McDermott-Water Quality Monitoring Section, ARESD Director-Sandra Flemming, and Regional Lab Managers that are analyzing/transporting samples. All of the staff listed in the Distribution List receive the QAPP and any updates/changes to the QAPP.

Name	Region/Office	Phone	Fax
Tabatha Corley	Region 5 Aiken	803-641-7670	803-641-7675
Rick Caldwell	Region 5 Aiken	803-641-7670	803-641-7675
Carol Copeland	BOW	803-898-4203	803-898-4117
Nydia Burdick	OQA- Columbia	803-896-0862	803-896-0850
Sandra Flemming	ARESD	803-896-0856	803-896-0868
David Graves	BOW	803-898-4398	803-8984200
Bill McDermott	BOW	803-898-4401	803-8984200
Meredith Murphy	BOW	803-898-4222	803-898-4140
Harry Mathis	Region 3 Columbia/Lancaster	803-896-0620	803-896-0617
Christine-Sanford Coker	Reg 7/Chas Regional Director	843-953-0150	843-953-0151
Sharon Gilbert	Reg 7/Chas Lab Manager	843-953-0150	843-953-0151

A4 Project/Task Organization

Comment: Anyone in a major role in the project must be listed and their role defined. The person who maintains the QAPP must be identified.

Tabatha Corley- is the Project Manager. In addition, Ms. Corley will analyze microbiological samples and will be the Data Verifier for this project.

Ben Buchanan – Will develop and maintain the QAPP. Mr. Buchanan will be the Field Manager/Investigator.

Greg Mason – Will assist in QAPP Development and as a Field Investigator.

Brant Anderson – Region Laboratory will analyze chemistry samples for those parameters done in the Regional Lab.

Bill McDermott– is the Data Validator for this project.

Kim Newell - GIS Maps. Will provide GIS Locations of the sampling sites and will provide all project maps with sampling sites clearly identified.

Carol Copeland – Will provide expertise from the BOW Program.

Nydia Burdick – Will review and approve the QAPP.

Region 5 Field Investigators- will survey the basin, determine sampling sites, and collect all samples.
Comment: Notice that the individuals were not listed. If only one or two people are specifically going to do this, then it may be decided that a QAPP needs to go to them both. For this project there is a field manager, who may choose to give them a QAPP, parts of the QAPP that pertain to them, or verbally give instructions.

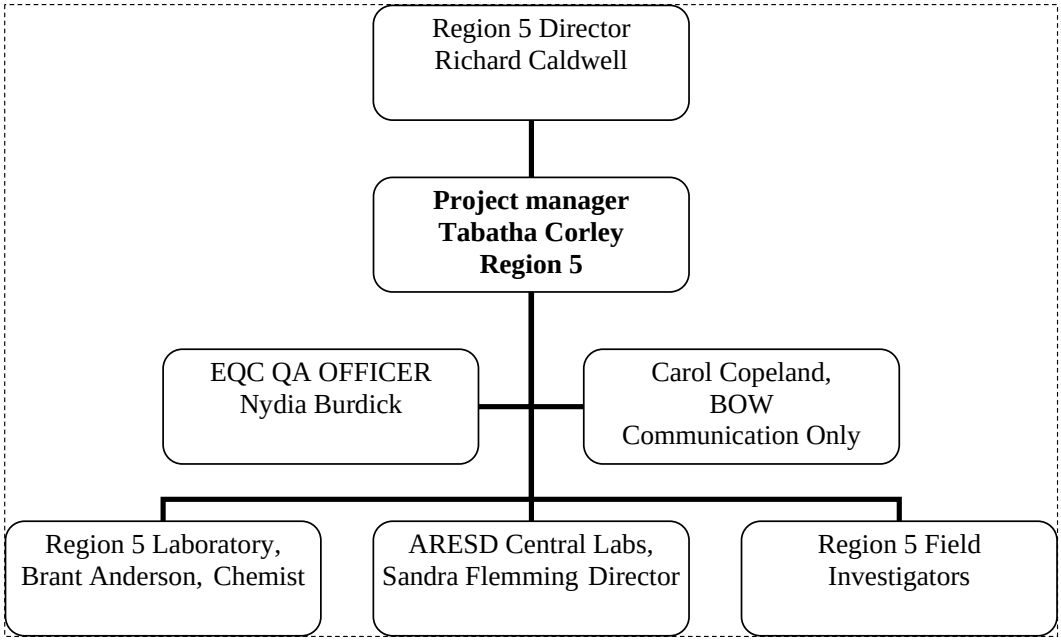

Table 1 Project Organization Chart

Comment- The chart above can easily be changed by clicking in the boxes. If more boxes are needed refer to the help section of MS Word under organization charts.

A5. Problem Definition/Background
Explain why the study is being done, the historical background, the regs involved, and what decisions or actions may come out of this study.

The Edisto River Basin contains the longest free-flowing black water river in America. The Basin stands as a unique asset to the State of South Carolina, due to its valuable ecological, economic, recreational, and cultural resources. The Edisto River starts in Edgefield and Saluda Counties (South Fork) and Lexington County (North Fork) and merges into one stream body in Orangeburg County flowing through Dorchester, Colleton, and Charleston Counties before reaching the Atlantic Ocean. The most significant threat to water quality within the Edisto River Basin is non-point source

pollution. The Edisto River Basin is on the 303(d) List for the following impairments, varying for different parts of the basin: pH, fecal coliform bacteria, mercury, dissolved oxygen, copper, ammonia, and turbidity. In most cases, the exact source of the impairment remains unclear. Such identification would facilitate corrective actions, aiding in the implementation of the State's Anti-degradation Policy as part of S.C. Regulation 61-68. Attainment of State water quality standards will serve the interests of the State of South Carolina. The purpose of this project is to locate possible non-point sources of pollution and then determine the extent that each source contributes to the impairment of the water quality.

Emphasis will be placed on the four major river systems that drain the Edisto River Basin. These four systems include: the South Fork Edisto, the North Fork Edisto, Four Hole Swamp, and the main stem of the Edisto River. However, because this River Basin extends into several EQC Regions, the project will be done in a stepwise manner by sub-watershed. This will take place within EQC Region 5, EQC Region 3 (Columbia) and EQC Region 7. The portion done by EQC Region 5 in Aiken will be addressed within this QAPP. EQC Region 3 and Region 7 portions of the project will be addressed in an addendum to this QAPP.

A6. Project/Task Description

Summarize what is to be done in the project, include the measurements that will be made (field and lab, approximate work schedules, detail where the study will take place-includes maps, and if there are any time or resource problems (personnel, weather, money—are examples).

As stated previously, the purpose of this proposed project is to identify problem areas as well as their probable sources and to bolster existing knowledge concerning the Edisto River Basin's ambient water quality baseline. Visual surveys were conducted prior to the beginning of the Project to identify any illegal or un-permitted discharges, any agricultural area of concern, and any construction/land clearing within the Edisto River Basin. The Visual Survey and 303(d) List were used as a basis for targeting and establishing Sampling locations were determined according to the visual survey results and sampling locations. From this the Project team determined that 8 sites (see Figure 1) would be included in this portion of the study and that sites would be sampled monthly.

Figure 1 Map of Sampling Sites (This would be the map where the sampling sites would be shown. The amount of maps used and detail given is up to the writer and the complexity of the project.

The following table gives Project activities and their anticipated date of initiation and completion.

Activity	Name/Group	Anticipated date of initiation	Anticipated Date of Completion	Comments
Visual Reconnaissance	Ben Buchanan	11/1/07	11/15/07	
Site Determination	Ben Buchanan	11/16/07	11/20/07	
GPS Training	Jeannie Eidson	12/1/07	12/1/07	
Project Training	Teddy Ambrose	12/15/07	12/15/07	
QAPP Approval	Ben Buchanan	12/15/07	12/31/07	
Sampling	Reg 5 Field Investigators	1/7/07	1/6/10	First Tuesday of each month.
Lab Cert Audit of Aiken Lab	OQA	Winter 2008, Winter 2009	~ 1 month after the Audit	Tentative date.
Data Verification	Region 5 Lab, ARESD, and Tabatha Corley	As samples are completed	Within 2 weeks of the last sample report	
Final Lab Report	ARESD	NA	4/1/10	
Data Validation	McDermott	As soon as Verification is complete	6/15/10	
Final Report on Region 5 portion	Tabatha Corley	7/1/10	8/1/10	

Comment [NB1]: The duration and the fact that there are more than 2 analytes being analyzed at the Lab make this a Class 3 QAPP. Using an external Lab would also make this a Class 3 QAPP.

Table 2 Project Schedule

The dates shown in the table above are estimates only. Because weather can impact the results of the data, it is important that sample be collected in both dry weather and wet weather. Wet weather or rain events are defined as rainfall that exceeds 0.10 inches. Sampling events may be delayed in the cases of serious droughts or rain events exceeding 2 inches. Emergencies in the Region may also delay sampling events.

Comment [NB2]: Note that a rain event is actually DEFINED.

A7 Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs)

Comment: Since we are using DHEC personnel to collect samples and analyze them the QC involved with field and lab instruments is already documented in the appropriate Manuals and these are cited. However, a schedule for field duplicates is not included in the SOPs and should be given here—which it is---along with the acceptable range.

All Measurement Criteria of QC performed in the Laboratory and in the Field will meet requirements as listed in the SOPs. For field collection and analysis the SOPs are located in the EQC Environmental Investigations SOP&QA Manual, 2006 Edition. DQIs for Chemistry analyses will be found in "Procedures and Quality Control Manual for Chemistry Laboratories", and for Microbiological Samples "Laboratory Procedures Manual for Environmental Microbiology". In addition all field duplicate precision measurements for metals, and inorganic parameters must be within 30% RPD. Representativeness is a great concern and the experiment design and the visual reconnaissance should ensure that the non-points sources are identified properly.

The DQO process for a Class 3 QAPP is flexible. That means if a step does not fit-say so and explain briefly why this was not addressed and then leave it out. For this example, every step is included. If help is needed with this portion of the QAPP, please contact the Office of Quality Assurance.

DQO Process:

1. **State the problem:** The Edisto River Basin is on the 303(d) list for metals and other contaminants. The sources of this impairment are largely unknown.

2. **Identify the decision:** What NPS are contributing to the water impairment?

3. **Identify inputs:** Visual assessments, surveying records, laboratory data from the project and historical data.

4. **Define the Study boundaries:** For this phase of the project the boundaries are those of the Edisto River Basin that is located in Region 5. The temporal boundaries are from Jan 2008-Jan 2009. (Be sure to include appropriate HUC). Water depth at which samples will be collected is 1 foot.

Comment [NB3]: Boundaries include time, place, depth and so on.

5. **Develop an analytical approach and a decision rule:** The analytical approach will be to test the waters upstream and downstream of a suspected NPS for those parameters for which the basin was placed on the 303(d) list**. If the concentration of one of these parameters (see A6 for parameters list) exceeds water quality standards and/or if the concentration above a potential source is lower than that below the source then the determination is that this NPS is most likely contributing to the impairment.**

Comment [NB4]: This statement is called an "IF" then "THEN" Decision rule.

6. **Specify limits on decision error:** Error is throughout the process of sampling and analysis. The most important DQI is representativeness. The Field manager must ensure that the sample sites have been located close enough to the site to determine the actual concentrations of pollutants in the effluent, and obtain samples above and below the suspected NPS to determine the impact. If samples are not located properly, chances of a decision error will be increased. Precision is also important. If the samples are taken in a haphazard way then the results will vary more widely. To assess this, duplicate field samples will be taken and compared. Precision of ± 30% are expected for all analytes except fecal analysis. Accuracy will be ascertained by submitting field blanks to ensure that the concentrations of each sample are solely due to the water that was sample, not contamination. The laboratory also has extensive QC to insure that results are accurate. Although sensitivity is not a problem with impaired streams, the lab has been asked to ensure that the state PQL is met by running a PQL standard. It is possible that a decision error could be arrived at if all sampling was taken in wet weather or in dry weather. If the weather patterns include long periods of rainfall or drought, the study will be extended in order to obtain samples under different meteorological conditions. In addition all weather data will be noted on either the chain of custody or in the field workbook.

7. **Optimize the design for obtaining the data:** If unlimited samples could be collected for this study, obviously the sites would be well characterized. Of course, this is not possible. However, extensive sampling and comparison with previously obtained data (historical data from STORET files) should ensure that what is really present at those sites has been well represented and characterized. Wherever possible, an existing site (or one that has historically be used) will be selected in order to have direct comparisons to historical data. Samples will be taken over various seasons in order to obtain an idea of year-round concentrations.

A8 Training

Comment: Only list specialty training—not normally given to Staff.

Specialized training for this project will include GPS measurements as well as downloading STORET data. Training will be documented through each Regional Office's Training Coordinator.

A9 Documentation and Records

Comment: Describe how personnel on the distribution list will receive the latest version of the QAPP. If reporting format will be different from what is normally received (special requests) give this information. If an outside Lab is involved, list what records and reports will be received and in what format—here you are telling the lab what you expect from them. Identify where project information will be stored and for how long—if this is according to an internal SOP, then cite this. If there are any special documents that will be generated by the project—here it's the final report---then list this.

The QAPP will be maintained by Ben Buchanan. Should a change be necessary, Mr. Buchanan will contact the Office of Quality Assurance (OQA). The OQA will review and approve all changes and determine if these changes are minor or extensive. All of those on the Distribution list will then receive the approved updates by courier. If the changes are determined to be extensive, the update will include a newly signed and dated approval sheet.

Documentation and records will include those records as given in the SOPs. At the end of the project, however, the Validator will require more extensive records that typically obtained by the Regional Labs. These records must include the PQL information for each batch run and the results of the duplicate field samples. This will be obtained from the lab in an EXCEL Spreadsheet. Project information will be uploaded into STORET. In addition the Laboratory will email EXCEL Spreadsheets with the information given by site and date. All records will be stored and archived according to Regional Office procedures.

Comment [NB5]: This is an example special requirement. Special requests like this must be worked out with the Lab and watershed manager prior to the QAPP being written.

A final report will be written by Ms. Corley and Mr. Buchanan. This report will be distributed to everyone on the Distribution List roughly 6 months after the final data is received. This time period is to allow for the Verification and Validation Processes.

Section B Measurement/Data Acquisition

B1 Sampling Process/Experimental Design

In December of 2007, EQC Region 5 Lab performed visual reconnaissance of the Project's Geographical Area. This reconnaissance included a walk of the River to sight out possible NPS. Items that were of interest included facilities, poultry enclosures, dog pens, etc.

In addition, the stream collectors listed out items they have noticed during routine sampling that may have implication for stream impairment. During this pre-sampling period, screen samples were taken in order to determine the final sampling site. As result of these activities the following sites were chosen for this study.

Comments: The table has made up Site ID names in the table. In this section the author should justify how the sites have been chosen—and justify the entire experimental design, how the sites will be identified and where the location of each site

is given. In addition, what will be done if a site becomes inaccessible? What information is critical---if a sample is lost, must it be replaced? Here, the acceptable loss is 10%--that may be too stringent for some projects.

Site ID	GPS Coordinates	Rationale for Site	Expected Concentration of Analytical Parameters	Site Usage	Comments
E-1		Upstream from possible NPS at E-2	Low	Fishing only	New site
E-2		Possible NPS-Dog Kennel	Very High Fecals	Fishing only	New site
E-3		Downstream	Fecals Above Standards for swimming.	Swimming and fishing	Current Site

Table 3 Example Site ID/Sampling Design Rationale Table

Samples will be identified with the Site name and the date of sample collection. Because the Water Quality Standards are given according to how the water body is used, the usage is included in the above tables as well as the expected concentration for possible impacted project parameters.

Sampling will begin 1/7/07 and end on 1/6/09. Sampling will be done as per the EEISOP and will take place on the first Tuesday of each month. One water sample will be taken from each site. For each sampling event a single duplicate will be collected at one of the sites All samples will be transported to the laboratory in order to meet required holding times.

If a sampling site becomes inaccessible, then sampling at that site will be delayed. If the inaccessibility will last for more than two weeks, a new nearby site will be located. This will be using the change procedure discussed in Section A9. This site must be sampled along with the original sample (when the site become accessible) for the rest of the project.

It is important to obtain at least 75% valid data from this project. If this is not achieved at the end of the expected sampling date, then the sampling will be extended in order to obtain 75% valid data.

Comment [NB6]: This answers the portion in the QAPP Guide which requires that the writer discuss what sample data is critical and what is not.

B2 Sampling Methods

Comments: Here is the detail on the actual sampling and the QC of the sampling portion. Most of this is covered in the EQC Field SOP, but it may be a very good idea to discuss how duplicates will be collected so that everyone is doing this the same way and on the same schedule. Although duplicates for this sample QAPP are being collected in a large bottle and then aliquoted, for some projects it may be more valid to collect two separate samples at the same time, or one after the other. It is important to make sure everyone is collecting duplicates in the same manner and so the way in which duplicates will be collected should be stated in the QAPP. This method must agree with the protocols as stated in the

EEISOP. Fecal samples must always be collected in 1 large sterile container and then aliquoted—even then precision can vary widely—through no fault of the collector or analyst.

All sample collection, field analysis, preservation, transport, handling and custody will be done according to the EEISOP. Sampling equipment that is re-used will be decontaminated as per the EEISOP. The daily field blank will be taken by rinsing the equipment with DI water and collecting this as the field blank. Field blanks will be handled exactly like the samples. Samples will be transported the EQC Region 5 Laboratory. All samples that must go to ARESD in Columbia for analysis will be transported via State Courier as per the EEISOP.

The duplicate location will rotate through the sites so that a duplicate is collected at each site at least once. Duplicates will be taken by collecting a large sample and aliquoting into two containers. There will be duplicate samples for fecals. These will be done with the single 200 ml sterile bottle used to collect the sample. Samples will be well shaken and then aliquoted aseptically into two 100 ml sterile bottles. Because of the nature of fecal samples the precision data is for informational purposes only.

If problems occur with broken samples or invalid samples due to temperature on receipt, the hold time was exceeded or other problems, Ms. Corley will determine any needed corrective action and if resampling is needed. This corrective action and the result of these actions will be documented on a project corrective action form located on the EQC Region 5 Server.

B3 Sampling Handling and Custody

Comments: Already covered in the EEISOP-unless an external lab is used. Then the Lab's Chain of Custody (COC) is used and must included in the QAPP as well as their COC SOP. IN ADDITION- if the State Courier is not used and samples are shipped via Greyhound, UPS etc. This must be stated.

All sample collection, field analysis, preservation, transport, handling and custody will be done according to the EEISOP. Samples will be transported to the lab so that hold times and temperature requirements as stated in Appendix A of the EEISOP are met.

Comment: B4 is on the next page in a table. For internal projects, the SOP IDs, Method Ref, and instrument are not needed. These are needed for the external Lab information. The PQLs should always be listed. These can be obtained through the QA Office. Mr. Graves and the Watershed Manager should be contacted to determine if the PQLs obtained from the QA Office will be sensitive enough for the project.

B4 Analytical Methods

Analyte	SOP Ref	Method Ref	Instrument	PQL	Lab	Turnaround Time
Temperature	EEISOP* Section 14	170.1	Thermometer/ Temperature Probes	**	Reg 5	Immediate
pH	EEISOP* Section 14	SM 4500H+B	PH meter	**	Reg 5	Immediate
DO	EEISOP* Section 14	SM 4500-O-G	DO meter or Hydrolab	**	Reg 5	Immediate
Turbidity	IX-B-14	SM 2130B	HF Scientific Micro 100	1 NTU	Reg 5	1 week
BOD	IX-B-2	SM 5210B	DO Meter	2 mg/L	Reg 5	2 weeks
Ammonia	IX-C-4(b)	Lachat 10-107-06-1-C:350.1	Lachat	50 ug/L	ARESD	4-6 weeks
Nitrate/Nitrite	IX-C-5	Lachat, 10-107-04-1-C Colorimetric, Cd reduction	Lachat	20 ug/L	ARESD	4-6 weeks
TKN	IX-C-7	351.2; Lachat 10-107-06-2-E	Lachat	100 ug/L	ARESD	4-6 weeks
Total Phosphorus	IC-C-11(a)	365.2 (withdrawn-SOP to be updated)	Lachat	20 ug/L	ARESD	4-6 weeks
Fecal Coliforms by A-1	IV-H (Micro Manual)	SM9221E MPN using A-1 media	NA	2 MPN units/100 ml	ARESD	1 week
Alkalinity	IX-B-7(b)	SM2320B	Man-Tech Analyzer	1 mg/L	ARESD	4-6 weeks
Total Organic Carbon (TOC)	IX-C-14	415.1 (MUR also withdrew this, SOP will be updated)	TOC Analyzer Shimadzu	200 ug/L	ARESD	4-6 weeks
Cadmium (Cd)	IX-D-1a (dig); IX-D-6	200.7	ICP	10 ug/L	ARESD	4-6 weeks
Chromium (Cr)	IX-D-1a (dig); IX-D-6	200.7	ICP	10 ug/L	ARESD	4-6 weeks
Copper (Cu)	IX-D-1a (dig); IX-D-6	200.7	ICP	10 ug/L	ARESD	4-6 weeks
Iron (Fe)	IX-D-1a (dig); IX-D-6	200.7	ICP	20 ug/L	ARESD	4-6 weeks
Lead (Pb)	IX-D-1a (dig); IX-D-6	200.7	ICP	50 ug/L	ARESD	4-6 weeks
Manganese (Mn)	IX-D-1a (dig); IX-D-6	200.7	ICP	10 ug/L	ARESD	4-6 weeks
Nickel (Ni)	IX-D-1a (dig); IX-D-6	200.7	ICP	20 ug/L	ARESD	4-6 weeks
Zinc (Zn)	IX-D-1a (dig); IX-D-6	200.7	ICP	10 ug/L	ARESD	4-6 weeks
Mercury (Hg)	IX-D-4(a)	245.1	Spectrophotometer-Meter and cold vapor	0.20 ug/L	ARESD	4-6 weeks

Table 4 Example Analytical Methods Table

Comment [NB7]: : PQL information is included in these QAPPs so that the Region has told the Lab exactly what sensitivity is needed. The concentrations given here are those for the methods the Lab usually runs on streams samples. There are more sensitive methods available, but they can take longer. Regions need to ensure that what is given in this Table will meet the needs of the project. In addition, the individual names of the SOPs and methods are not needed unless an outside lab is used.

Page Break

B5 Quality Control Requirements

Comments: Internal Lab QC is already documented in the SOPs. Field QC (other than that give in the EQC EISOP must be given.

All QC done in the Laboratory is stated in the SOPs. Field QC samples are as listed below.

Comment [NB8]: The Field QC requirements are laid out in the EEISOP, however, the project manager may determine that further QC is needed. In this instance a field blanks and duplicates that are not required for metals analysis is included.

Item	DQI	Frequency
Field Blanks	Contamination –accuracy/bias	1 per day per parameter
Field Duplicates	Precision	1 per day per parameter- Fecals will be split from 1 large sample. (See EEISOP)
Inter-Laboratory Duplicates	Precision between methodology	Possibly 1 per study for metals.

Table 5 Field QC Activities and Frequency

Lab SOPs include procedures for dealing with QC that is out of control. Should Field blanks and field duplicates be outside of the acceptable range (see A7), then Mr. Buchanan will determine the cause and address corrective actions. Corrective actions and the result of the actions will be documented in a project corrective action form located on the EQC Region 5 Server.

QC Statistics for the Laboratory are included in the Lab SOPs. Precision will be determined for Field Duplicate Samples using Relative Percent Difference (RPD). This is calculated as follows:

$$RPD = \frac{A - B}{Avg\ of\ \ A, B}\ x\ 100\%$$

In addition, the Validator will also perform some statistical calculations. The first one will be to determine that 75% data validity was obtained. This is calculated as follows:

$$\%\ Valid\ \ Samples = \frac{\#\ Valid\ \ Samples}{Total\ \ \#\ Samples}\ x\ 100\%$$

The Validator may also calculate recoveries for LFBs, LFMs and other QC from the Lab Data. This is calculated as follows:

$$\%\quad \text{Recovery}\quad = \frac{Actual\ \ Amount\ Obtained}{Theoretical\ \ Amount}\ x\ 100\%$$

Comments: The Validator may have other statistics they wish to use. These must be included here.

B6 Instrument/Equipment Testing, Inspection, and Maintenance

Comment: This is already documented for our field and Lab personnel. An external lab would have a full write-up plus attached SOPs.

For SCDHEC Operations field equipment information is found in the EEISOP and in the manufacturer's literature. All SCDHEC Laboratory instrument testing, inspection and maintenance is found in the SOPs and in the Instrument Manufacturer's literature.

B7 Instrument Calibration and Frequency:

Comment: This is already documented for our field and Lab personnel. An external lab would have a full write-up plus attached SOPs.

For SCDHEC Operations field instrument calibration information is found in the EEISOP and in the manufacturer's literature. All SCDHEC Laboratory instrument calibration information is found in the SOPs.

B8 Inspection/Acceptance Requirements for Supplies and Consumables

Not required for a Class 3 QAPP.

B9 Data Acquisition Requirements (Non-Direct Measurements)

Comments: Any data that is not directly produced by this project are non-direct measurements—this includes modeling. Include what you are using and justify its inclusion. The data used must be of known quality.

The data obtained from the study will be compared to historical data. Because the historical data was analyzed by the same laboratories and, for the most part, by the same methodology; it is directly comparable to the study data. In addition, meteorological data will be used (obtained from the National Weather) to correlate data with precipitation amounts.

B10 Data Management

Comments: Unless there is an outside lab or if there are special requests that are not outlined in a SOP this section is not necessary for a Class 3 QAPP. If data is going through the normal route, then state that this is not required for this QAPP.

Not required for a Class 3 QAPP.

Section C Assessment and Oversight

Not required for a Class 3 QAPP,

Comments: --unless there is an outside lab.

Section D Data Validation and Usability

D1 Data Review, Verification and Validation

Comment: What will be done to a sample that has failed QC or other requirements? Will it be flagged (annotated) to say what happened to it? For our ARESD and Reg Labs, samples are not flagged. A comment is inserted in the report—that's why that is N/A.

Item	Criteria	If Criteria are not met, is the sample data rejected or flagged?	Flags	Comments
Field Blanks	Must have a concentration of analyte below the PQL	Rejected for that parameter(s).	Not applicable for ARESD	
Hold times	Samples must be received within holding time.	Rejected	Not applicable for ARESD	
Duplicate Field Samples	Samples must be within ±30%	Flagged by Validator.	Not applicable for ARESD	All parameters except Fecal Coliforms
Temperature upon receipt	Must be within acceptance range	Samples associated with that temperature blank are rejected.	Not applicable for ARESD	
LFM	Must be within stated criteria in the SOP	Sample rejected based on Matrix effects. Comment on the SOP.	Not applicable for ARESD	
LFBs	Must be within stated criteria in the SOP	Samples rerun. If not enough volume, sample results rejected	Not applicable for ARESD	
PQL Standard	Must be within stated criteria in the SOP	Sample rerun. If not enough sample volume,	Not applicable for ARESD	
BOD-GGA QC	Must be within stated criteria in the SOP	Sample rejected.	Not applicable for ARESD	

Table 6 Criteria Used for Accepting, Rejecting or Qualifying Data

Comment [NB9]: In this table there are items that will not be used in the normal internal projects. However, if an outside lab is used many of these will have to be stated or a reference to a SOP must be included. Items that will not be needed for a totally internal project includes LFBs and LFMs. Unless field blanks are required for an analysis this can also be left out.

D2 Validation and Verification Methods

The process for Verifying and Validating the data is as follows.
Comments: This is just an example. The way staff will verify must be discussed and agreed upon. The way validation will be done must be worked out with the Validator. A reasonable discussion or list of steps showing how verification and validation will be done is all that is needed here. It is NOT advised that staff who are producing data be selected as the data validator.

Verification:

1. Analyst rechecks calculations and data transformations and transcription.
2. Supervisor or Designee verifies calculations and data transformations and transcription.
3. Data is sent out to the Regional Office and Program.
4. The Project Data Verifier does the following
    a. Completeness check—The Verifier checks that all data has been received from the lab and field
    b. Documentation check—The Verifier checks that all documentation on the sample from collection to the final report is done properly. During this time the verifier also notes and records any comments made by the collector or the Lab concerning any sample. This will allow the Validator to determine if the comments impact the validity of the results which will affect the usability of the data.
    c. Reporting---The Verifier follows up on any problems noted above. After this the Verifier sends a report to the Validator. This report notes missing data, incomplete or inconsistent documentation, and any comments made on specific samples (see b).
5. The Project Data Validator does the following:
    a. Looks through the data for invalidated data due to items on the criteria table.
    b. Determines the % valid samples and, if under 75%, meets with the Project Manager, Program Representative, and Regional Director to determine further action (i.e., resampling). Any corrective actions are also documented on the Project Corrective Action Form located on the Region 5 server.
    c. Compiles the Corrective Action forms and determines if the original problems that were corrected affected the data and if the correction fixed the problem.
    d. Examines the Verification Report to determine if problems detected by the Verifier will impact the data.
    e. Examines the data from previously used sites against the historical records determining if the data agrees or disagree with what has been seen in the past at those sites. If there are inconsistencies, he documents these.
    f. Compares the data near the NPS and the upstream and downstream data. If there are inconsistencies, he documents these.
    g. After the above assessments, the Validator researches the data and/or documentation that is inconsistent. This is done by contacting Lab and Field Personnel to try and correct and/or explain inconsistencies.

h. After all of the Validation steps have been completed, the Validator submits a report to the Project Manager who will include this report as appendix to the final report.

Appendix

Example of an Alternate A-7 DQI Measurements Table—this information would be obtained from an external Lab. This Table is just an example and is not complete.

Analytical Group*	DQI	QC used to Assess/ min. frequency	Measurement Performance Criteria
Temperature	Accuracy	Check against the NIST thermometer Quarterly	Within 1 degree of the NIST
DO	Accuracy	Check reading of saturated air against barometer and charts; at every 3rd stop	Within 0.2 mg/L of what is read from the charts.
pH	Accuracy	pH 7 Buffer check at every stop	Within 0.2 S.U.
Cd, Cr, Cu, Fe, Mn, Ni, Pb , Zn, Ammonia, Nitrate/Nitrite, TKN, TP, Mercury	Precision	Field Duplicates, 1 per day?	±30%
	Precision	Lab Duplicates, 1 per batch of 10	±20% or within Lab limits (20% is max).
	Accuracy	Lab Reagent Blanks (LFB), 1 per batch of 10	< MDL
	Accuracy (Matrix effects)	Lab Fortified Matrix, 1 per batch of 10	±30%
Ammonia, TKN, Nitrate-nitrite	Accuracy	LFB, 1 per batch of 10; also second source standard, daily	±10%
	Accuracy (Matrix effects)	Lab Fortified Matrix, 1 per batch of 10	Within control limits
	Sensitivity	PQL Standard, 1 daily	±50%
BOD	Precision	Duplicated samples	±20%
	Accuracy	GGA	Within acceptable range. (198± 30.5 mg/L)
	Accuracy	Blanks	< 1.0